

# Urban Ecology

Building design for a sustainable future



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In highly urbanised environments, such as metropolitan Melbourne, it is important to recognise the importance of maintaining and increasing the health of our urban ecosystems to improve living conditions not only for the fauna but also ourselves.

This fact sheet will explain ways to improve our urban ecosystem through the incorporation of vegetation through landscaping for both new and existing developments.

## Why do we need to change our thinking regarding Urban Ecology?

Urbanisation in cities and suburbs has altered natural environments and processes such as soil drainage, overland and waterway flows, light availability and the habitat for birds and other wildlife.

For example, removing areas of vegetation and replacing this with hard surfaces including roads, driveways and paving increases stormwater runoff and contributes to flash flooding. This damages our landscapes, waterways and buildings.

There is much we can do in our metropolitan areas to overcome the loss of natural processes and improve liveability for people, flora and fauna.

One of the easiest actions involves decreasing the areas of hard or impervious surfaces and at the same time increasing vegetation and landscaping.

In fact, research indicates that landscaping in metropolitan environments can reduce air conditioning costs by up to 50 percent, by shading the windows and walls of a home. Just one healthy tree can be the equivalent of ten room-size air conditioners operating 20 hours a day.

The benefits to our urban ecology include reducing overall temperature and noise, increasing air purification and providing habitat for local fauna.





# How will improved Urban Ecology benefit me?

## Economic

The economic benefits of having trees in the proximity to buildings can be both direct and indirect:

- Air-conditioning costs for cooling can be up to 50 percent lower in a tree-shaded home as the home is provided with effective shading of windows and walls.
- Trees increase in value from the time they are planted until they mature. The housing market acknowledges that landscaped homes are more valuable than non landscaped homes.

The savings in energy costs and the increase in property value directly benefit each home buyer.

## Health and wellbeing

Studies show that green spaces (plants, trees, parks etc.) are good for human health and wellbeing. What's more, green spaces in cities have been closely linked with improved physical, social, and mental well-being. Studies have found that hospital patients with a view of green space from their window, compared with a wall, needed less pain medication and recovered faster from surgery.

## Environmental

Vegetation in cities assists in moderating ambient temperatures. This reduces the urban heat island effect which is caused by pavements and buildings absorbing heat. For example, effective shading of a window or home can negate the need to have air-conditioning.

Trees and shrubs can also be carefully selected to:

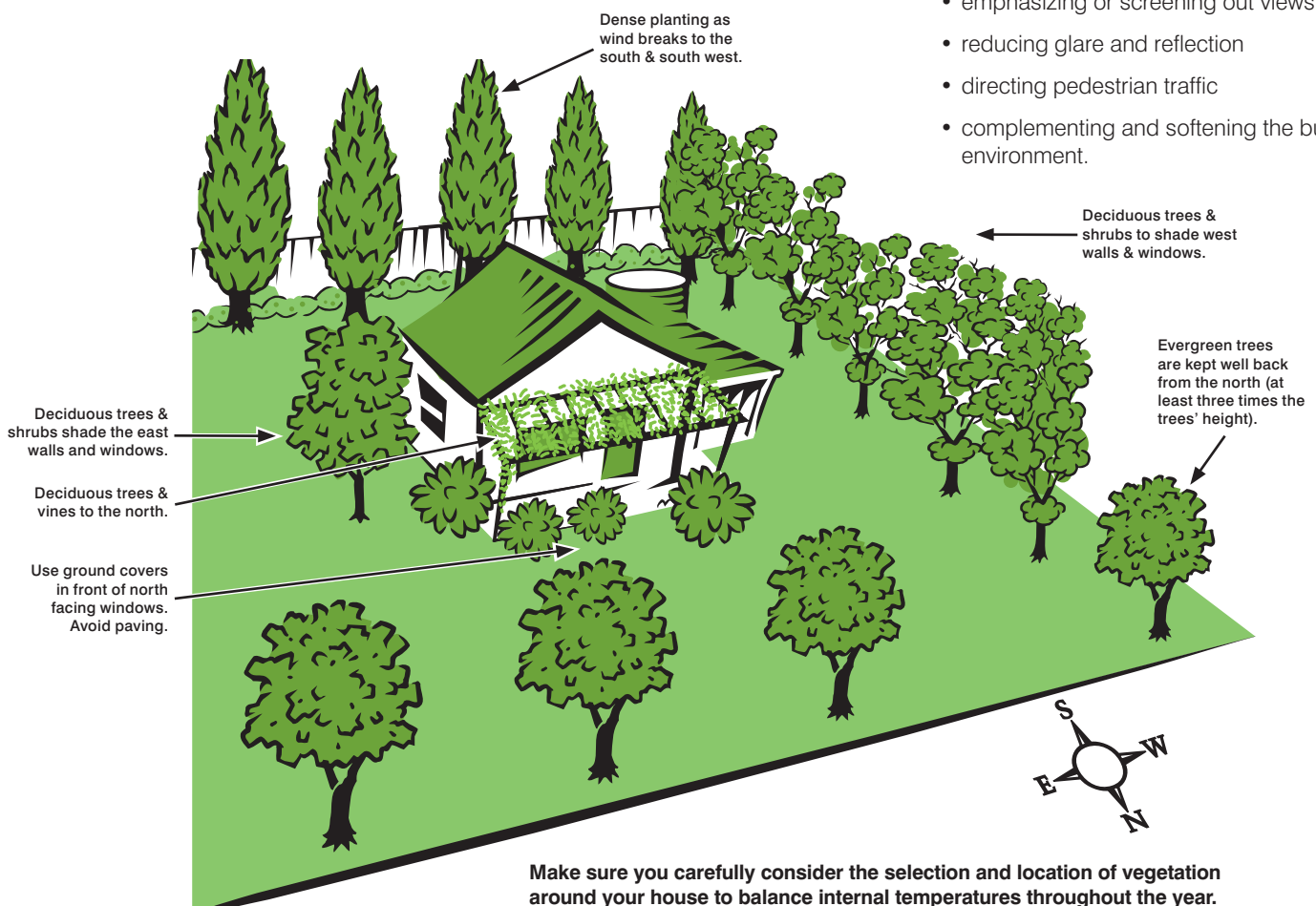
- reduce glare
- reduce penetrating winds
- control airflow
- improve air quality
- sustain a viable ecosystem for birds, small animals, and insects.

“Incorporating vegetation and landscaping into urban developments provides many benefits to residents, developers and the community.”

## Communal

Metropolitan vegetation and landscaping often provides the following communal benefits:

- providing privacy
- emphasizing or screening out views
- reducing glare and reflection
- directing pedestrian traffic
- complementing and softening the built environment.



**Make sure you carefully consider the selection and location of vegetation around your house to balance internal temperatures throughout the year.**



## What can I do to improve Urban Ecology?

### Landscaping for seasonal heat control

- It is best to protect north, east and west facing windows as this will help protect against hot summer sun.
- Deciduous vegetation will provide summer shade but allows winter sun to penetrate the building.
- Trees with dense foliage create more shade and therefore have greater cooling abilities.
- As space is often limited in urban developments, vegetating courtyards as much as possible is an effective way to reduce temperatures in your courtyard and internal living spaces.
- Vertical shading is most appropriate for east and west walls and windows to protect from hot summer sun at lower angles e.g. trees, shrubs and vines supported on a frame.
- Utilising plants that grow on walls (such as ivy) can act as thermal insulation for a building.
- Horizontal shading is best for north facing windows e.g. deciduous vines grown over a pergola.
- Tall evergreen trees should not be planted too close to north-facing windows as they create too much overshadowing in winter.

“ The first step to improving local urban ecology is to conduct a site analysis. From there, a landscape design can be developed that will assist in determining the best location for vegetation and the greatest contribution it can make. ”

### Landscaping to reduce glare and ground temperature

Glare occurs when intense sun reflects from surfaces such as paving, roofs and walls. Glare can be reduced by increasing ground cover, low growing shrubs, lawns and vegetated roofs and walls.

Ground cover planting not only reduces glare, it also decreases surface temperatures. For example, a vegetated courtyard can be 6°C cooler than a paved courtyard.

In addition, a vegetated surface allows stormwater runoff to be absorbed into the soil which reduces stormwater runoff, improves stormwater quality and increases soil moisture.

Green roofs are known to help lower urban air temperatures (heat island effect), provide building insulation and create a habitat for wildlife.



### Green roofs and walls

Green roofs and walls are a great way to not only enhance the local urban ecology but also to improve the insulation of a building. This will keep internal spaces warmer in winter and cooler in summer. In urban areas, green roofs also help reducing the heat island effect, which describes the fact that metropolitan areas are generally warmer than rural areas. This is due to the extensive use of materials, such as concrete and bitumen, that retain heat.

#### There are three types of green roofs:

- Intensive roofs, which have a deeper substrate and can support a wider variety of plants but are heavier and require more maintenance.
- Extensive roofs, which have a shallower substrate, supporting a lighter layer of vegetation.
- Planter boxes on roofs, which can be installed on most accessible flat roofs and often represent a simple alternative to intensive and extensive green roofs.

#### There are two main types of green walls:

- Green facades, where a wall or structure is designed to allow for climbing plants to grow onto.
- Living walls, where modular systems of growing media are integrated into, or fixed onto, a wall.



## What can I do to improve Urban Ecology?

### Landscaping to reduce wind penetration and capture summer breezes

Vegetation can be selected and positioned to control the chilling effects of winter winds and also assist in capturing and harnessing cooling summer breezes.

Things to consider when landscaping to influence winds:

- Windbreaks are most effective when located at 90° to the direction of the wind.
- A windbreak with 50–60% density is generally more effective than a solid one, as a solid wall can create turbulence.
- Large dense shrubs can be used as windbreaks to the south-west to counter cold winter winds and channel cooling summer breezes.
- Medium to large-sized shrubs or trees clipped to form a hedge can provide useful still air insulation and shading when grown close to a wall.
- Careful positioning of windbreak planting can encourage the entry of desirable summer breezes through the building.
- Low shrubs, lawn and ponds to the north will help cool hot summer winds.

### Landscaping to increase habitat

In addition to creating larger areas of habitat in local parks and reserves, sustainable gardening around dwellings and buildings can contribute to increasing habitat value and urban ecology.

Points to consider to achieve a sustainable habitat garden include:

- It is possible to have contemporary gardens, e.g. cottage or formal gardens, and still utilise indigenous plants.
- Select plants that are indigenous as they will best suit your local climate and soil. Research what plants will attract native birds and insects.
- Complete a site analysis focusing on soil quality, sun, shade and privacy before you choose your native plants.
- Get a copy of Council's local plant guide.
- Avoid using plants that are known environmental weeds.

## Mandatory Requirements and Council's Best Practice Standards

### Mandatory Requirements

You must meet:

Local Planning Scheme provisions for minimum site permeability, protection of significant trees and vegetation (as applicable).

### Council's Best Practice Standards

Protect existing on-site vegetation.

- Provide areas for social interaction between building occupants.
  - Incorporate indigenous and/or productive gardens into the design.
  - Provide a tap for irrigation and drainage on balconies and courtyards.
- Developments, which seek to vary from these best practice standards, must demonstrate how improved Urban Ecology can be satisfactorily achieved.

## Where can I find out more?

### Save Energy Through Landscape Design

Sustainability Victoria  
[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

### Urban Ecology Information

Urban Ecology Australia  
[www.urbanecology.org.au](http://www.urbanecology.org.au)

### Technical Manual Green Roofs

Your Home  
[www.yourhome.gov.au](http://www.yourhome.gov.au)

### Sustainable Gardening Information

Sustainable Gardening Australia  
[www.sgaonline.org.au](http://www.sgaonline.org.au)

### Green Building Council Australia

Change in Ecology Calculator  
[www.gbca.org.au](http://www.gbca.org.au)

### Green Roofs, Walls and Facades

City of Melbourne  
[www.melbourne.vic.gov](http://www.melbourne.vic.gov)

**Other Fact Sheets in this series are also available to provide guidance on the 10 Key Sustainable Building Categories. For further information on Urban Ecology consider the Fact Sheets entitled:**

- Green Roofs, Walls and Facades
- Stormwater Management
- Water Efficiency
- Energy Efficiency